



**(43) International Publication Date**  
**26 August 2004 (26.08.2004)**

**PCT**

**(10) International Publication Number**  
**WO 2004/071339 A3**

- (51) **International Patent Classification<sup>7</sup>:** **A61B 17/58,**  
17/56

(21) **International Application Number:**  
**PCT/US2004/003605**

(22) **International Filing Date:** 5 February 2004 (05.02.2004)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**  
10/358,530 5 February 2003 (05.02.2003) US

(71) **Applicant (for all designated States except US):** **PIO-NEER LABORATORIES, INC.** [US/US]; 375 River Park Circle, Marquette, MI 49855 (US).

(72) **Inventors; and**

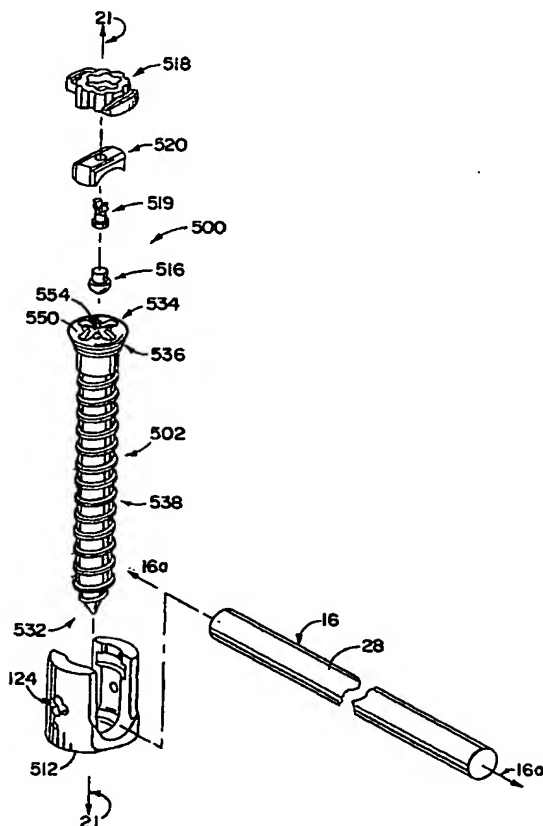
(75) **Inventors/Applicants (for US only):** **JANOWSKI, Brian, P.** [US/US]; 971 Highland Drive, Marquette, MI 49855 (US). **KORHONEN, Francis, J.** [US/US]; 522 Elm Street, Negaunee, MI 49866 (US). **KILPELA, Thomas, S.** [US/US]; 1600 County Road #492, Marquette, MI 49855 (US). **BERREVOETS, Gregory** [—/US]; 143 Heidtman, Skandia, MI 49885 (US).

(74) **Agents:** **SAMPLES, Kenneth, H.** et al.; Fitch, Even, Tabin & Flannery, Room 1600, 120 South LaSalle, Chicago, IL 60603 (US).

(81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

*[Continued on next page]*

**(54) Title: LOW PROFILE SPINAL FIXATION SYSTEM**



**(57) Abstract:** A spinal fixation system (500) is provided that, in one form, includes a coupling member (514) having a cam lock member (518) that is fixed against translation therealong as it is turned with turning of the cam lock member (518) causing an elongate member (16) such as a spinal rod to be pushed downward in the coupling member (514) for fixing the rod therein. In another aspect, the rod is fixed against a low profile insert (516) that seats in a recess formed in the head of an anchor member (502) projecting from the coupling member (514). The insert has an upper surface against which the rod is fixed and that in one form is flat to provide for line contact against the rod so as to minimize damage thereto.



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— with international search report

(88) **Date of publication of the international search report:**

2 June 2005

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/03605

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61B 17/58, 17/56  
US CL : 606/61

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 606/61, 60, 53, 72, 73

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1,190, 678 A2 (BONO et al.) 27 March 2002 (27.03.2002), See whole document	1-5, 8, 9, 21-23, 27-29
X, P --- Y, P	US 6,554,834 B1 (CROZET et al.) 29 April 2003, (29.04.2003), See whole document	1-3, 9-11, 13, 14, 15, 17-19, 21-23 ----- 16
X, P --- Y, P	US 6,565,565 B1 (YUAN et al.) 20 May 2003 (20.05.2003), See whole document	1-6, 8, 9, 11 ----- 16

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

### \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance  
"E" earlier application or patent published on or after the international filing date  
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  
"O" document referring to an oral disclosure, use, exhibition or other means  
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art  
"&" document member of the same patent family

Date of the actual completion of the international search

07 February 2005 (07.02.2005)

Date of mailing of the international search report

24 FEB 2005

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Jessica R Baxter

Telephone No. 703-308-0858